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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/606,104

06/25/2003

Tzu-Yu Wang

H0004823 (1139.1140101)

4209

22913

7590

01/05/2006

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EXAMINER

NGUYEN, PHILLIP

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 01/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/606,104	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> Phillip Nguyen	<b>Art Unit</b> 2828	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 November 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see pages 2-5, filed 11/17/05, with respect to claims 8-36 have been fully considered and are persuasive. The Final Rejection, mailed on 5/17/05, has been withdrawn.

With respect to claims 1-7, applicant's arguments filed 11/17/05 have been fully considered but they are not persuasive. On page 2 of the Appeal Brief, applicant argues that claim 1 requires that said one layer has an aluminum content of less than 60% before being oxidized while Jewell teaches that the Aluminum will comprises at least 60% of the group III material in oxidizing, i.e. oxidizable layer". As the result, Jewell does not teach or suggest each element of claim 1. Examiner disagrees with this argument and maintains the same rejections with following reasons:

Jewell clearly teaches that the aluminum content should be at least 60% which means the Aluminum could be equal to 60% or more. Applicant claims that the aluminum content is less than 60% which means it could be between 60% to 0%. In this case, Examiner assumes that if the aluminum content in the layer is less than 60% but very close to 60%, such as 59.9999999999999999 where it could extend until the aluminum content almost reaches to 60% but never becomes 60%. It is believed that the properties of these two materials are the same or at least the change in the laser output is insignificant or negligible.

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Applicant's arguments with respect to claims 8-36 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

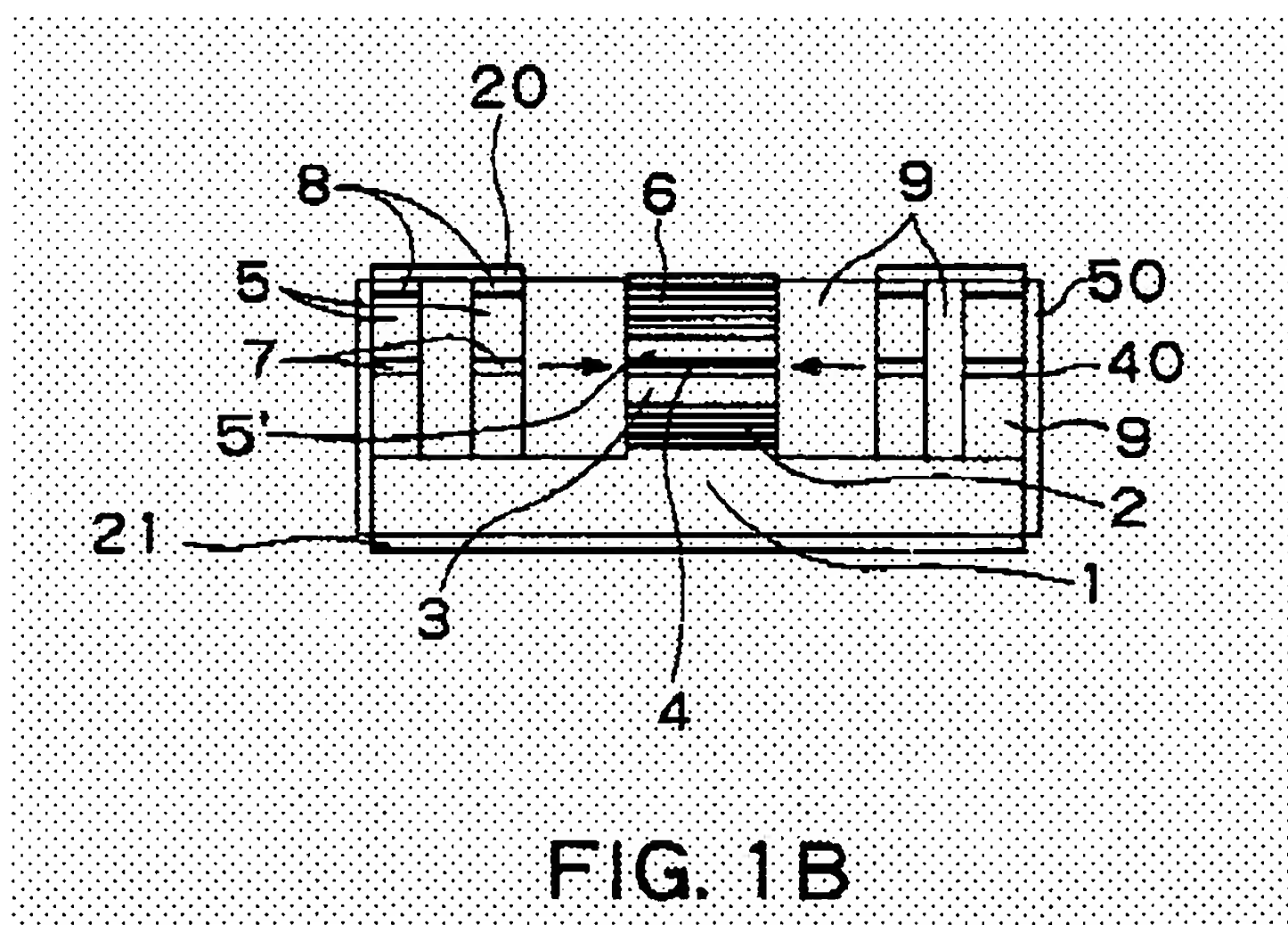
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 8-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Kinoshita ('537).



With respect to claims 8-9, 16-17, and 21, Kinoshita discloses in Fig. 1B (above) a vertical cavity surface emitting laser comprising a first mirror (DBR 2) having a plurality of layers including at least one pair of layers having an InP layer and an oxidized layer a cavity proximate to said first mirror; and a second mirror (DBR 6) proximate to said cavity (col. 4, lines 38-39 and lines 46-52). Kinoshita further discloses first mirror 2 being proximate to the substrate 1 which is made of InP (col. 4, line 32).

With respect to claims 10 and 18, since applicant fails to further limit the invention but only claim the output of the laser which is its capability and Kinoshita discloses the same product and structure, it is believed that the laser taught by Kinoshita would inherently produce the same output wavelength which is greater than 1200 nm. Kinoshita further discloses each of first and second stacks of layers 2 and 6 has a thickness of approximately  $\frac{1}{4}$  of the optical wavelength (col. 1, lines 25-37).

With respect to claim 11, Kinoshita discloses said second mirror 6 comprising a plurality of layers having at least one InP layer (col. 1, lines 38-47).

With respect to claim 12, Kinoshita further discloses the cavity has at least one quantum well in active layer 4 (col. 4, line 34).

With respect to claims 13 and 22, Kinoshita discloses both first and second mirrors being selectively partially oxidized, and therefore it confines current (col. 4, lines 41-44).

With respect to claim 14, Kinoshita further discloses a first electrical contact 20 on said second mirror and a second electrical contact 21 on the substrate.

With respect to claim 15, Kinoshita discloses an Intracavity contact layer 3 disposed between the first mirror 2 and the cavity; a first contact on said second mirror 20 or any contact

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surface such as the DBR 6 upper surface since applicant has fails to limit the claim invention to when claiming only a contact. The second contact is the upper surface of the contact layer 3.

With respect to claim 19, Kinoshita discloses the partially oxidized layer of first stack 2 being made of InAlAs (col. 1, lines 25-27 and col. 4, line 47).

With respect to claim 20, Kinoshita teaches every other layer of said second stack of layers comprise InP (col. 1, lines 44-47).

With respect to claims 23-30 further recite a method for making a laser. Since Kinoshita discloses the product, it is inherent product by process for performing a method as recited in the claims.

3. Claims 31-32 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Jiang et al. ('892).

With respect to claim 31, Jiang discloses in Fig. 1-3 a VCSEL comprising a first mirror 106 having six or less pairs of layers (col. 3, lines 49-52), wherein one layer of each pair of layers is an oxidized layer (abstract); an cavity proximate to said first mirror; and an second mirror 131 proximate to cavity.

With respect to claim 32, Jiang discloses each oxidized layer in each pair of layers 106 has less than 60 percent aluminum before being oxidized (col. 4, lines 1-6).

4. Claims 31 and 33-34 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Eisenbeiser et al. ('265).

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With respect to claim 31, Eisenbeiser discloses in Fig. 1 and 3 a VCSEL comprising a first mirror 24 having six or less pairs of layers (paragraphs 0004 and 0017), wherein one layer of each pair of layers is an oxidized layer 14; an cavity proximate to said first mirror; and an second mirror 26 proximate to cavity.

With respect to claim 33, Eisenbeiser discloses a second layer of each pair of layers being InP (paragraphs 0004, 0016).

With respect to claim 34, Eisenbeiser discloses each oxidized layer being formed from InAlAs (paragraph 0004).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-7 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell ('891).

With respect to claim 1, Jewell discloses in Figures 5D-5F and 7 a vertical cavity surface emitting laser comprising a substrate 82; a first mirror 118 situated on said substrate; an active region 86 situated on said first mirror; a second mirror 122 situated on said active region; a first electrical contact 128 situated on said first mirror; and wherein said first mirror comprises a plurality of pairs of layers 119 and 120; and one layer 119 of at least one pair of the plurality of pair layers is an oxidized layer; wherein said one layer has an aluminum content of less than 60% before being oxidized. It is noted that Jewell discloses the aluminum content in the oxidized



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layer is at least 60%. However, the claimed content of aluminum is **very** close to that of the prior art. According to the Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985), where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Therefore, it is obvious that even the range is not overlapped; the laser would be expected to produce the same result. In this case, Examiner believes that the claimed content of aluminum is extremely close to the prior art range.

With respect to claim 2, Jewell discloses the substrate comprising InP (col. 7, lines 2-4).

With respect to claims 3 and 4, Jewell discloses the oxidized layer comprising at least one of a group comprising oxidized **InAlAs**, InAlGaAs, AlAs, AlGaAsSb, AlGaPSb and AlPSb and one layer of least one pair of the plurality of pairs of layers comprises InP (col. 7, lines 4-9).

With respect to claims 5-7, Jewell discloses said second mirror comprises a plurality of pairs of layers 123 and 124; and one layer of at least one pair of the plurality of pairs of layers of said second mirror **comprises InP** and one of a group comprising InGaAsP, InAlAs, InAlGaAs, AlAs, AlGaAsSb, AlGaPSb and AlPSb (col. 7, lines 9-14). It is noted that Jewell discloses InAlGaP or InGaAsP which **comprise InP**. It is also noted that the material such as InGaAsP sometimes includes different molecular composition ratio, for example,  $\text{In}_{1-x}\text{Ga}_x\text{As}_y\text{P}$  where x and y are in the range between 0 and 1.

With respect to claim 35, Jewell discloses the claimed invention except for explicitly teaching the number of pairs of both first and second mirrors. Applicant has argued in the Response received on 11/17/05, pages 4, paragraphs 2-4, having a large number of pairs of



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mirrors are known and therefore Jewell would not disclose the number pairs 6 or less. Based on the arguments of the applicant, Examiner assumes that this argument is correct.

6. Claims 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita ('537). Although Kinoshita does not mention about the number of pairs of mirrors; it has been known in the art to include a large number of mirror pairs which is more than 6 pairs as indicated by applicant.

### *Conclusion*

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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***Communication Information***

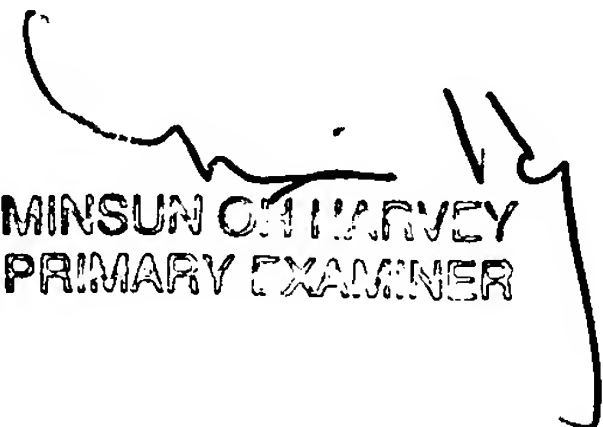
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip Nguyen whose telephone number is 571-272-1947. The examiner can normally be reached on 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY, can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MINSUN O. HARVEY  
PRIMARY EXAMINER